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(54) **Folding platform container**

(57) A transport container has a platform base 2 to which are pivotally mounted folding structures 9,10,18. To hold each folding structure 9,10,18 in an upright condition a bar 12, preferably pivotally mounted by a pin 19, is turned to engage in slots formed in components of a corner fitting 17, the bar 12 being pivoted to an upright position 12' for release. Abutment plates 13 of th folding structures rest on corresponding abutment faces of the base 2 in the upright condition, the latter faces having apertures which are exposed when the structures are folded down.

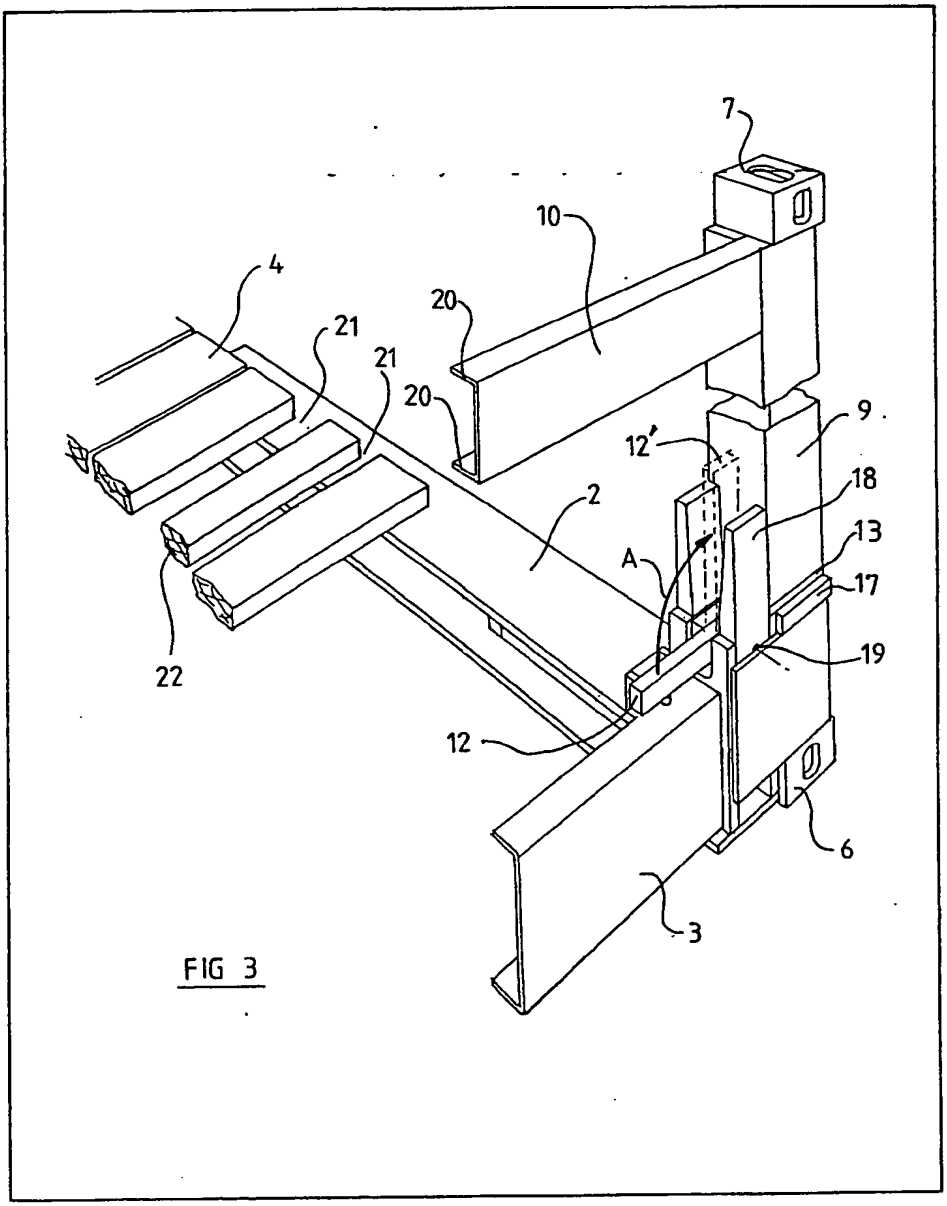

FIG 3

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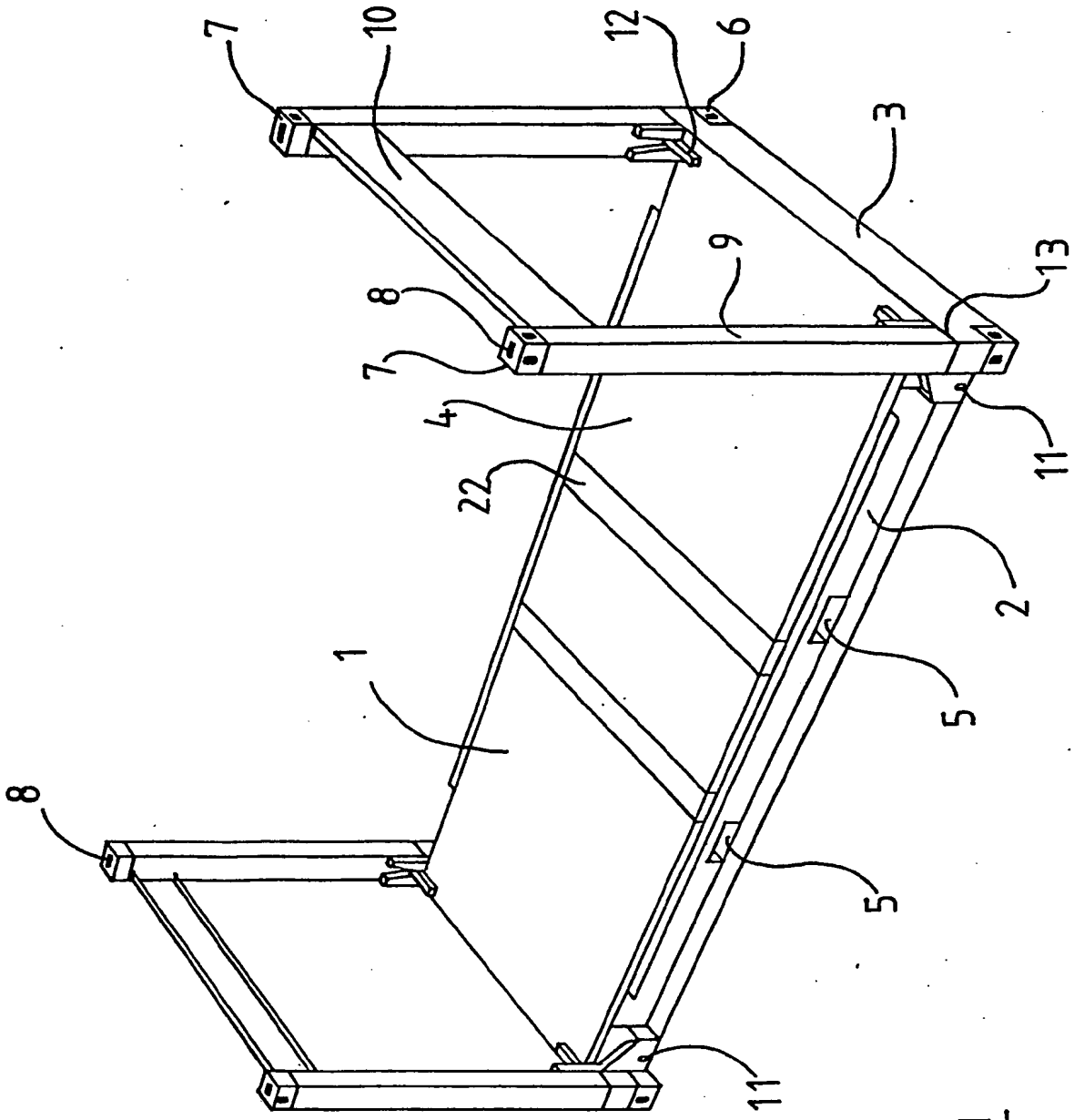

FIG 1

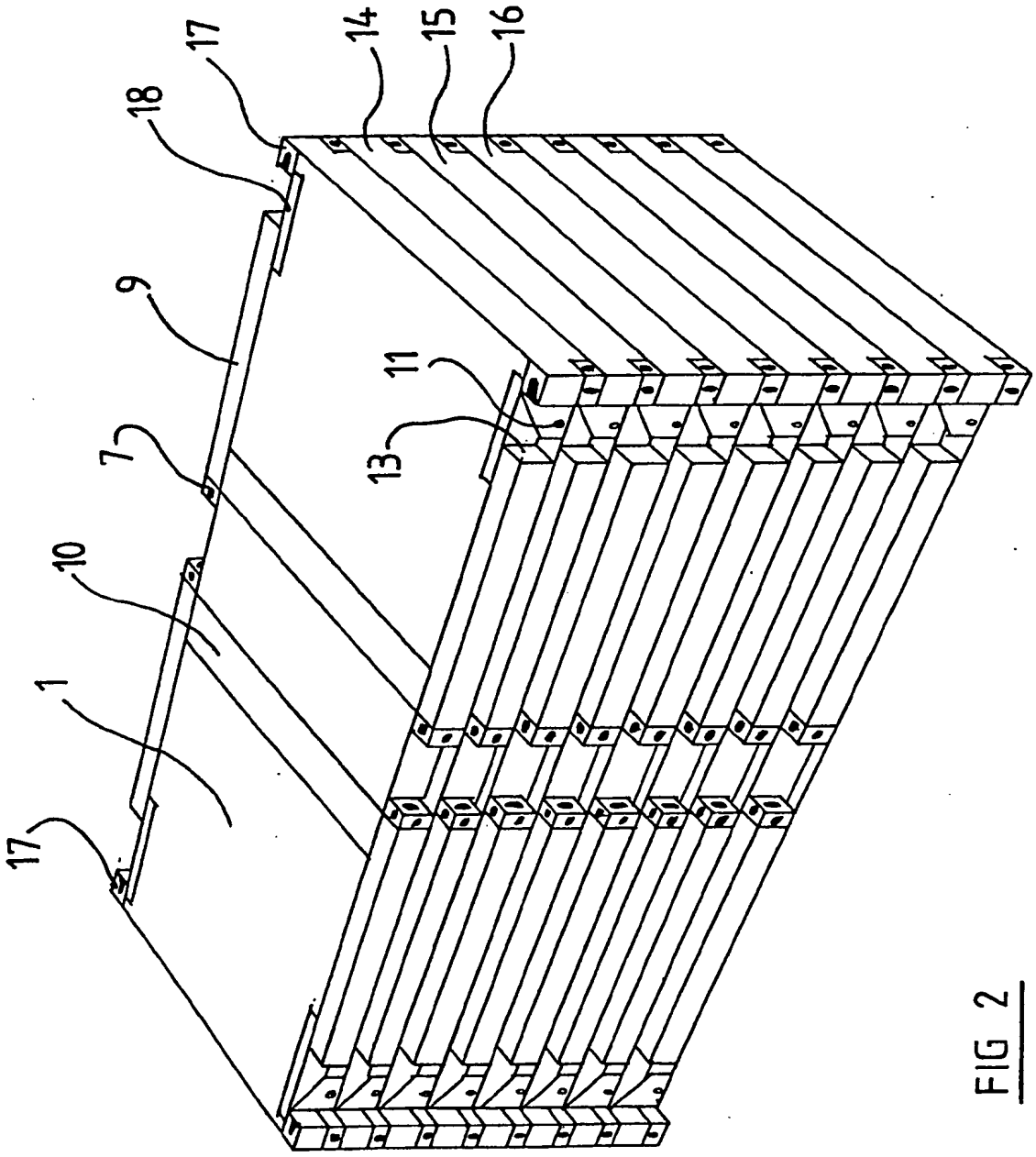

FIG 2

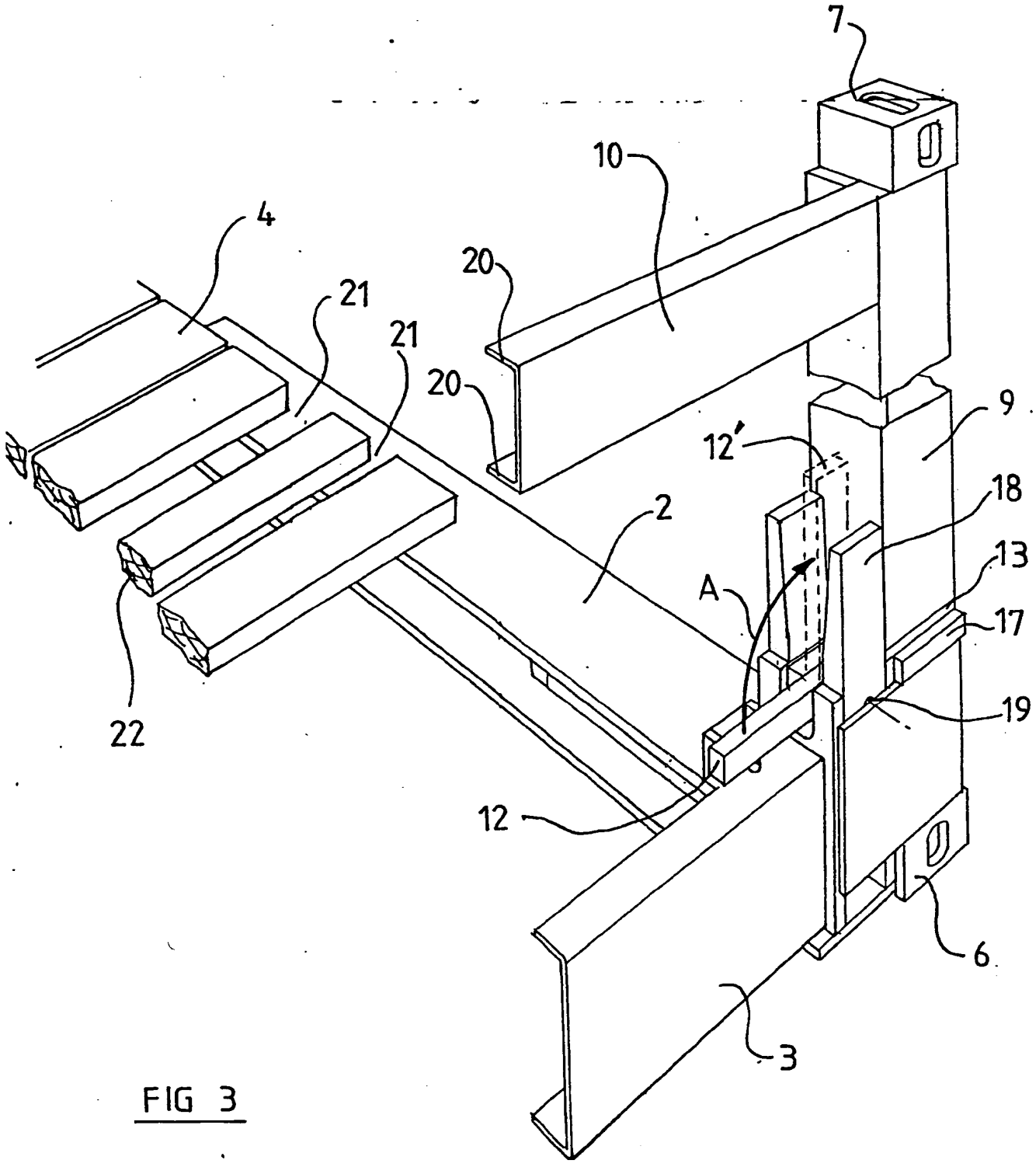

FIG 3

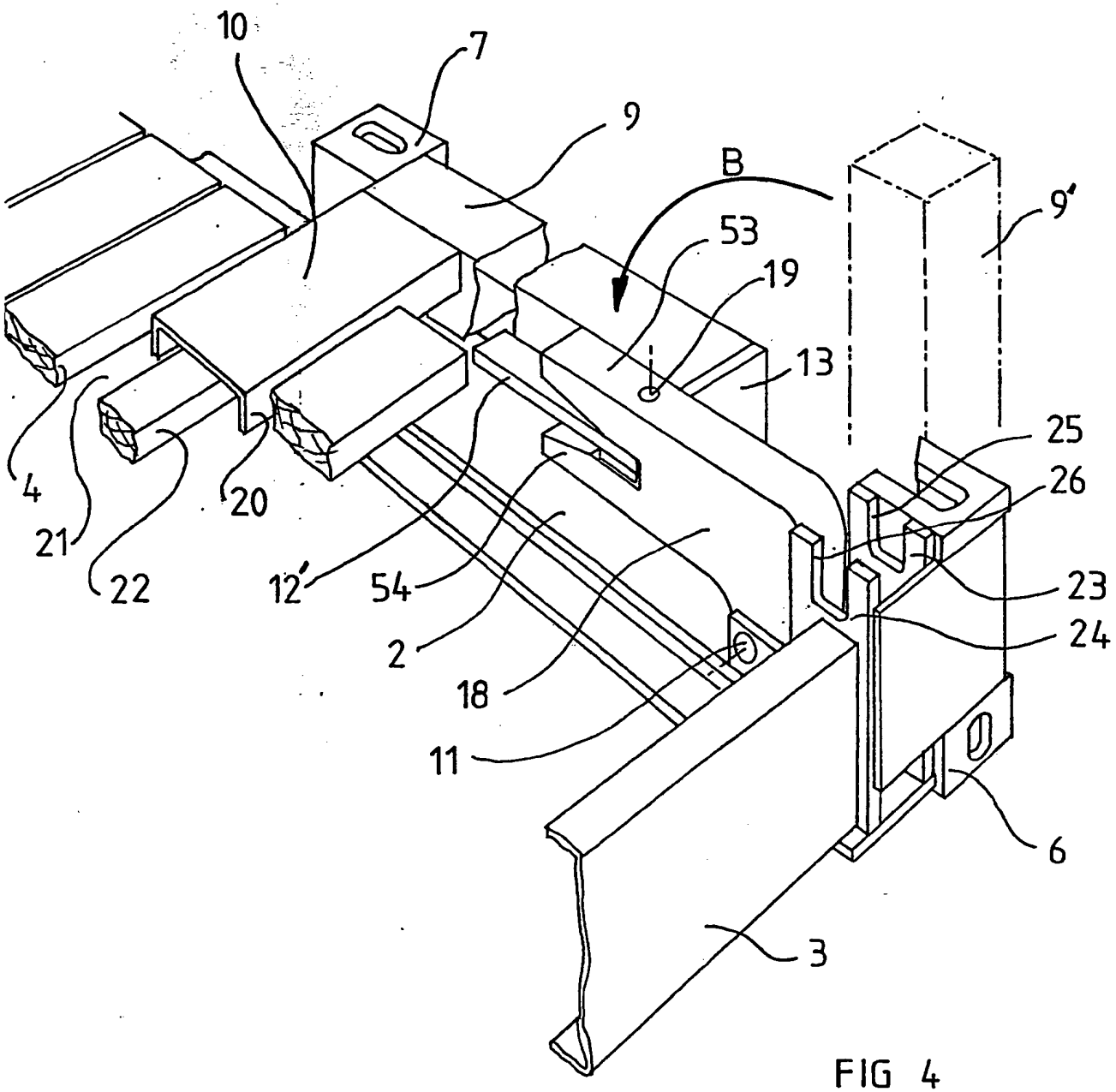

FIG 4

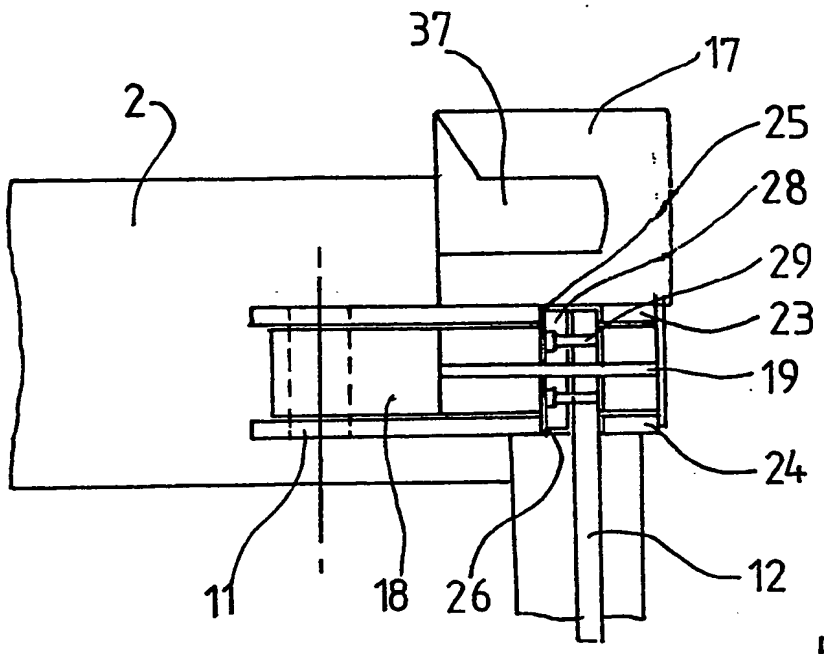

FIG 5

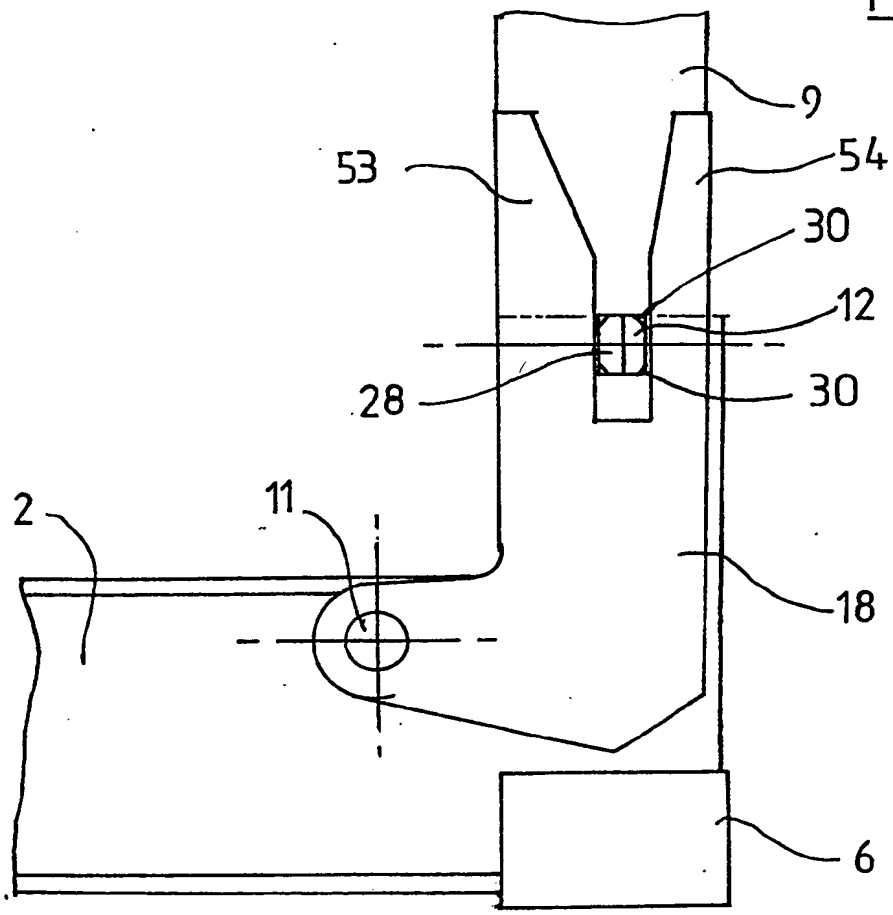

FIG 6

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FIG 7

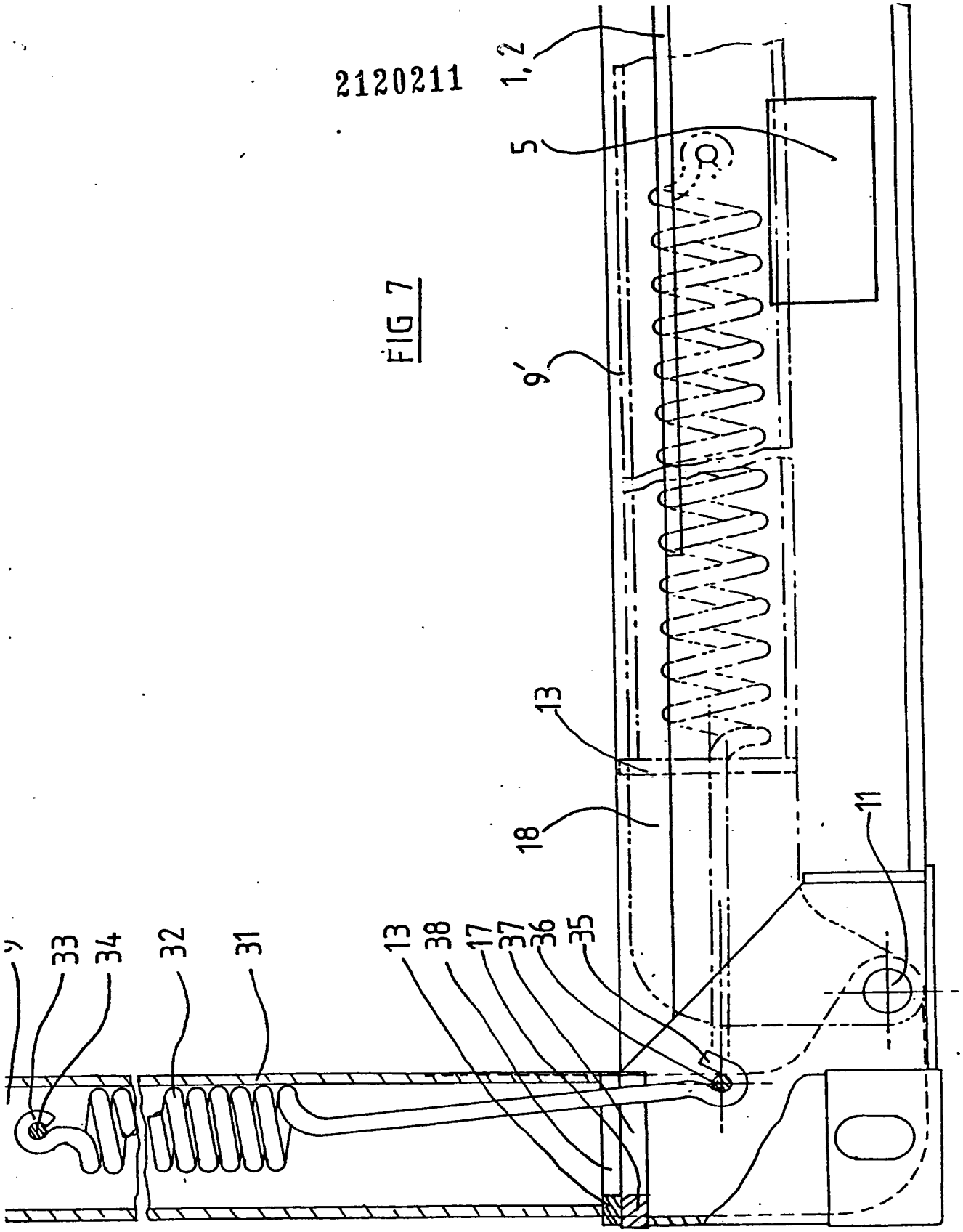

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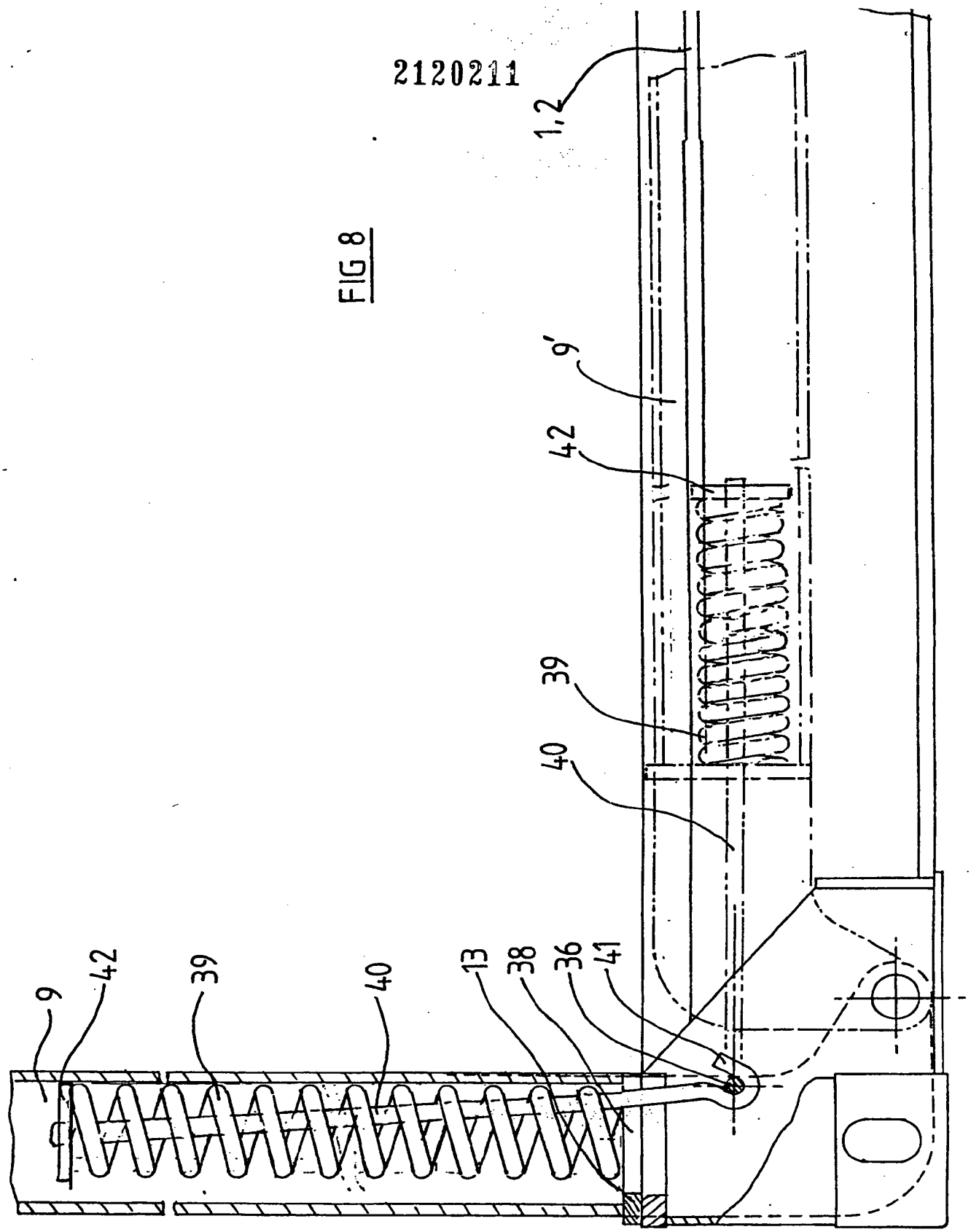
FIG 8



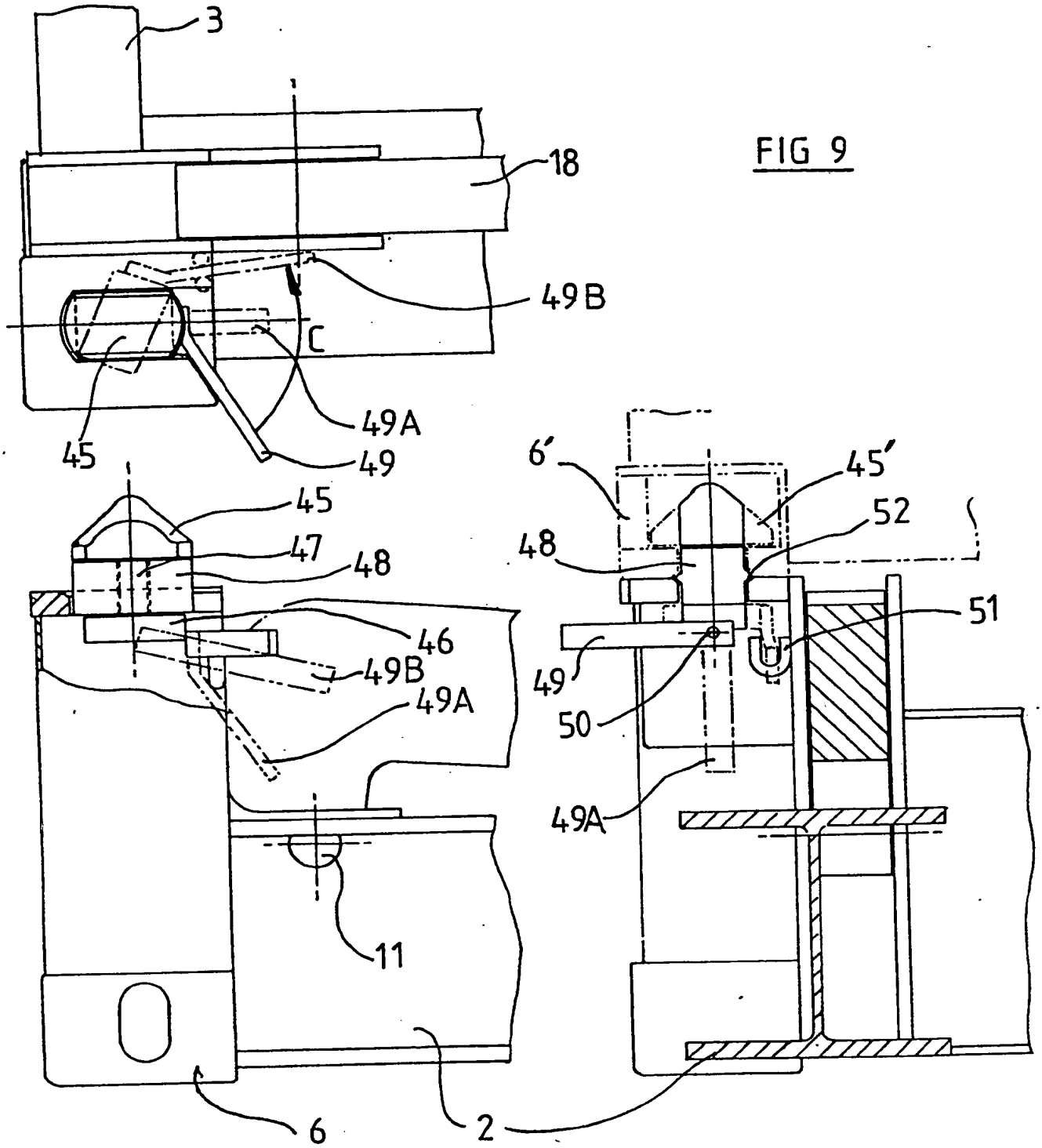


FIG 9

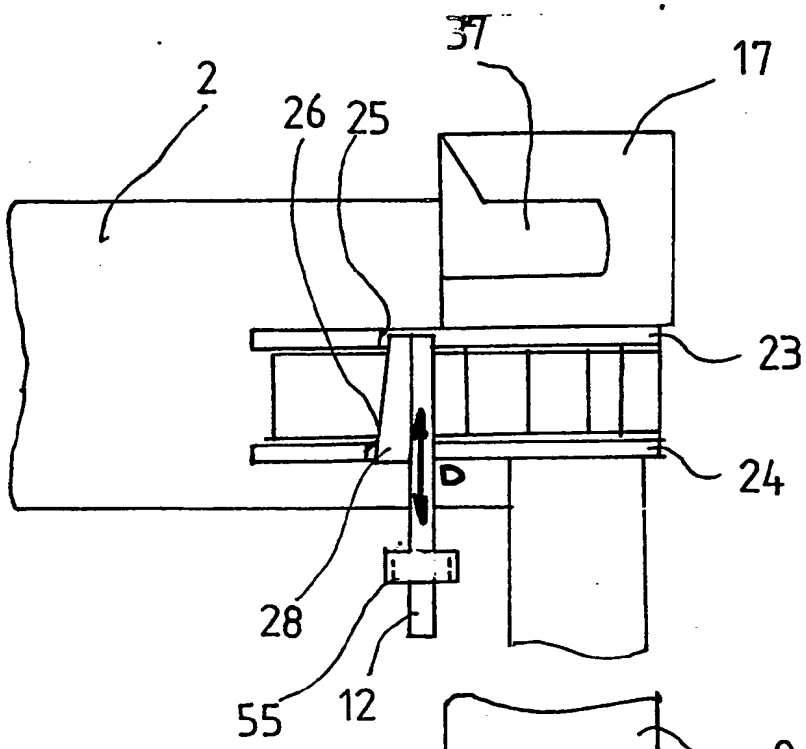


FIG 10

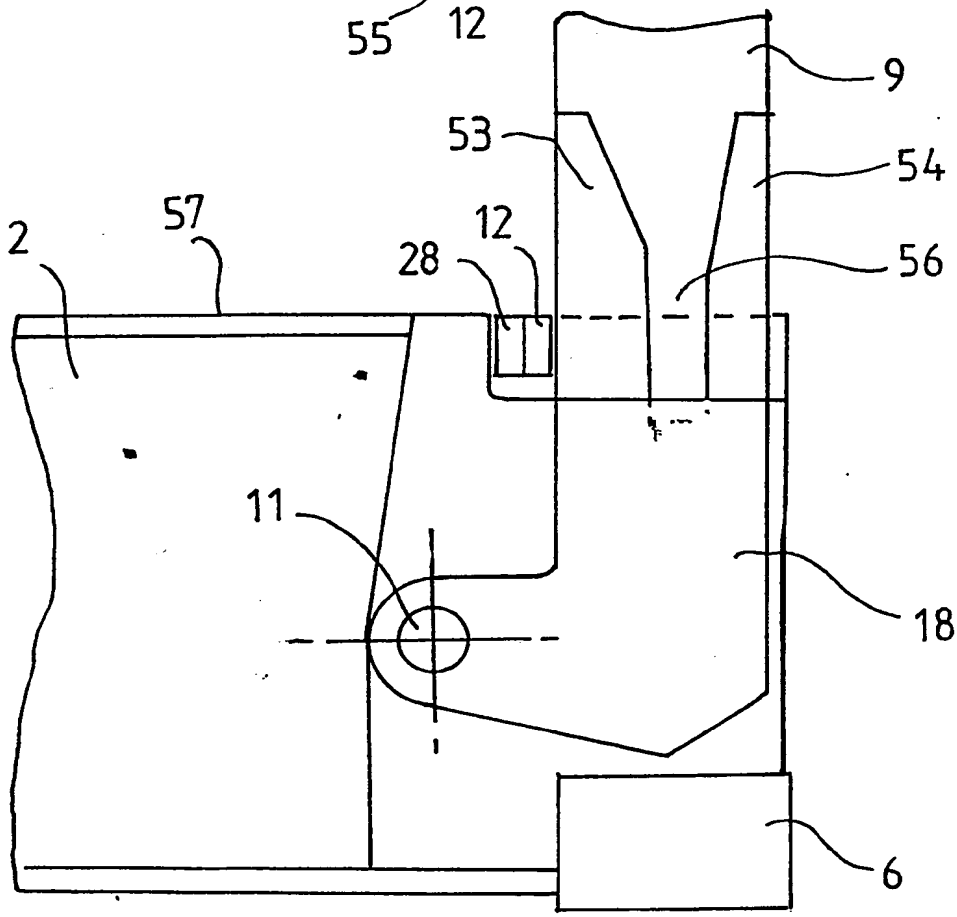


FIG 11

SPECIFICATION

Folding platform container

This invention relates to a container or load carrying platform for the use of the transportation of goods. It is common to load goods into rigid containers of a standard size shape and strength. In the international shipping industry, the degree of standardisation has extended to cover a range of freight containers which have at each corner a special fitting which enables the containers to be handled, transported and secured by compatible standardised equipment such as trucks, rail waggons, ships and cranes, and which enables the containers to be stacked one upon another and secured to each other. The positioning of the corner fittings must be accurately maintained both in the unladen static state of the container and also in the dynamic and loaded condition such as when carried on deck in heavy seas, if the container is to remain compatible with the handling equipment and to be safely secured.

It is sometimes desirable that a container be provided which when empty of cargo, can be folded down to a fraction of it's erected size, and then transported back to the loading point, or stored more conveniently . If the containers can be folded and a number of them linked together into a pack which is then of an overall size and performance as a standard freight container, then economic savings can acrue from being able to handle several containers in one operation.

There are now many containers of this type of folding unit which conform to standard requirements and it is desirable that such containers possibly of different design and manufacture can be easily linked together for safe modular transportation when in the folded condition.

However the folding container is formed, it is important that when erect, the corner fittings are supported in a sturdy and ridgid manner in the prescribed position. The supports should be easily released once safety devices have been purposefully removed since the containers will be required to be operated in remote areas of the world where technological knowledge is limited. Similarly, in remote places lifting equipment may be limited so that the supporting components of the folding parts, and the folding parts themselves should be either light weight or counterbalanced by springs to enable one or more men to lift the very heavy folding structure.

Containers are often handled roughly and it is therefore important that delicate or brittle parts are well protected against impact. Otherwise a broken or damage spring for example might go unnoticed and the heavy folding part fall freely onto the operator.

When folded, the container is normally unuseable as a pallet or platform container since the folded parts may lie ontop of the load bearing deck, and as such would be damage if cargo were placed upon them. Thus it would be an advantage if the parts were either protected against damage or folded out of the way of the cargo area. This then would allow use of the container as a flat pallet.

In the folded condition, it is typical for the containers to be linked together. Two or more stacks of these containers might then be carried on a single truck or waggon, and because of restrictions of width on rail and road, the stacks would be place in a line along the waggon. The stacks would also be close to one another for economy of space. Having arrived at their destination, it can be found that there is no lifting equipment strong enough to lift a complete stack and each container must be lifted separately. To do this, it is necessary to disconnect the interlinking devices between the containers. This can only be done from the side of the waggon and container stack since the stacks are touching or very close on their ends. So it is desireable to have interlinking devices operable from the side of the container.

The standard freight container does not have any parts projecting outside an envelope defined by the position of the corner fittings. This is because the projection might itself get caught and damaged, or may cause damage to an adjacent container, structure and so on. Thus a desireable feature of any of the operating devices on a folding would be that they do not project outside the container profile unless held in such a position by the operator and automatically stowed inside when released by him.

The cost of manufacturing is important to be observed and in particular, any special machining of components to fine tolerances should be avoided on such a large and bulky structure.

It is the objective of the present invention to provide features which can be used individually or in combination to meet the requirements of a folding container as outlined.

According to the invention there is provided a rectanguler and ridgid platform base to which there are attached by pivots or other means structural members. The members are arranged so that they can be folded from an erect and substantially vertical position to a substantially horizontal position, which may be on top of the platform or beside it. In th erect position there is provided locking means which ensures that the structures remain erect under handling operations, and which can be released so as to allow movement of the structures. There is further provided resiliently biasing which may support the free moving structure and enable the structures movement by manual means against an otherwise massive weight. Having folded the structures there is provided means of support for the structures so that they might receive safely upon them substantial cargo without undue strain. Further there is provided a means whereby folded containers can be linked together with other units of standard form to form a stack.

In order that the invention may be fully understood and readily carried into effect, a preferred embodiment thereof will now be described by way of example only with reference to the accompanying drawings.

Figure 1 shows a perspective view of a platform container with foldable ends, these being in the erect position.

Figure 2 shows a perspective view of the same container in the collapsed position and stacked upon

a plurality of similar collapsed containers.

Figure 3 shows a perspective view of one corner of an erect contaiener broken away from the whole unit for clarity.

Figure 4 shows the same corner of Figure 3 collapsed down to the platform base.

Figure 5 shows a plan view of a corner of the erect container broken away from the whole and sectioned through the locking arrangement to reveal certain features.

Figure 6 shows a side elevation of the same corner as Figure 5 broken away from the whole and sectioned through the locking and pivot arrangement for clarity.

Figure 7 shows a side elevation of one corner with the corner post in the erect and folded position, partially sectioned to reveal resiliently biassing features.

Figure 8 shows the same corner as Figure 7 but with an alternative spring arrangement.

Figure 9 shows plan, elevation and end elevation of one corner of the collapsed container with a device in place on the top of the corner used for linking folded containers together.

Figure 10 shows a plan view of the corner of the erect container broken away from the whole and sectioned to reveal internal details.

Figure 11 shows a side elevation of the corner of Figure 10 again broken away from the whole.

Referring now to the drawings, a load carrying container or platform usually referred to as a collapsible flat container, comprises a substantially rectangular platform base 1 formed from ridgid steel longitudinal members 2 and similar lateral members 3. The decking of the platform may be of steel or timber 4 or other suitable material. Within the base 1 are formed lateral tunnels 5 through which lifting tynes may pass and handle the containner as required. At each corner of the base 1 is a corner fitting 6 similar to corner fittings 7 at each of the top corners of the erect container. The position of the corner fittings 6,7 may be defined by international standards as may be their size and shape, and the size and shape of the appertures 8 formed in their sides.

At each corner of the base 1 there extends a corner post 9 and these may be connected to one another by cross members 10 which may comprise one or more beams or a composite structure, or the corner posts 9 may stand free of connection. Each corner post 9 is connected to the base 1 via pivot pins 11. The corner posts 9 are prevented from rotation about the pivot pins 11 by releasable locking devices 12 and abutment plates 13.

In Figure 2 a number of collapsed containers are shown stacked one upon another indicated by numbers 14,15,16 and so on. Th corn r posts 9 can b s n in a g nerally horiz ntal position t where they have rotated about the pivot pins 11. The abutm nt plate 13 is m re clearly visible and anoth r corner fitting 17 which was covered by the abutment plate 13 is exposed. The corner fitting 17 is ridigidly attached to the base 1.

In Figure 3, the enlarged view of one of the base corners shows the corner post 9 which is ridgidly attached to a clevis plate 18 which craddles the locking device 12 and forms one part of the pivot arrangement through which the pin 11 passes. The locking handle 12 is attached to the clevis plate 18 by pivotal means via a pivot pin 19 which passes through the clevis plate 18 and the locking device 12. Thus the locking device 12 may rotate if so move to a position 12' indicated by the dotted lines and the arrow A.

The form of the cross beam 10 can be seen to be an open channel with flanges 20 projecting in towards the base of the container. The decking timber 4 can be seen laid laterally accross the longitudinal members 2. There is formed a gap 21 between the timbers 4 at selected positions.

In Figure 4 the same corner post 9 is shown folded down onto or adjacent to the base 1. The flanges 20 of the cross beam 10 correspond with the gaps 21 formed between the timbers 4 and contact may be made between the cross beam 10 and the timber 22 that the beam 10 straddles.

The locking device 12 can be seen in the released position 12'. On either side of the clevis plat 18 are support plates 23,24 which have appertures 25,26 formed in their uppermost portions. The plates 23,24 are attached ridgidly to the base 1 and may form the supporting part of the pivot pin 11 which retains the corner post 9 to the base 1 via the clevis plate 18. The movement of the corner post 9 from the erect position to the collapsed position is indicated by the arrow B and the dotted lines 9'.

In Figure 5 the sectional drawing shows the locking device 12 in the locked position as it bridges between the plates 23,24 by passing through the appertures 25,26 and through the clevis in clevis plate 18. Attached to the locking device 12 is an extension block 28 held in position rigidly to the device 12 by clamping screws 29. The pivot pin 19 passes freely through the locking device 12 and its block 28.

Figure 6 shows the section through the locking device 12, block 28 and the clevis plate 18. The edges of the block and locking device 28,12 may be shaped 30 to guide in the movement of the locking device 12 and block 28 between the appertures 25,26.

In operation, any movement of the corner post 9 away from or towards the base 1 is prevented by the pivot pin 11 holding the clevis plate pivotally to the plates 23,24 whcih themselves are ridgidly attached to the base 1, and the locking device 12 and block 28 which bridging between the plates 23,24 through the appertures 25,26 stops movement of the clevis plate 18 and thus the post 9. It may be arranged that there is a small clearance btween the locking device 12, block 28 and the appertures 25,26 depending on the allowable movement in the corner post 9. Furthermor , th mov m nt f th post 9 may be such as to allow the abutment plate 13 to make contact with the corner fitting 17 which in the event that the locking device 12 was released would prevetn outwards movement of the corner post, 9.

When vertical loads are pressed on to the top of the corner fitting 8, the loads can be transmitted to the ground under the lower corner fitting 6 through the pivot pin 11 and also the abuttment plat 13 and

corner fitting 17 if they are in contact,. To release the corner p st 9 from th erect positi n, th locking device 12 and attached block 28 are rotated about the pivot pin 19.

The width of the assembly 12,28 is such that it is less than the distance between the plates 23,24 and may be less than the thickness of the plate 18 so that in the free position shown by 12' in Figure 4 and Figure 3, the clevis plate 18 can rotate inwards to the base if so moved with the narrower assembly 12,28 passing freely between the plates 23,24. When the corner post 9 is moved about the pivot pin 11, it finally comes to rest upon or near the base.

If so desired, the flanges 20 may pass through gaps 21 between the floor members 4,22 or alternatively, if there are no gaps arranged, the corner post 9 cross beam 10 or other part of the moving assembly may contact the base.

If it is desired to load the container when in the collapsed position with cargo, the cargo can be loaded directly onto the uppermost face of the collapsed post 9, or cross beam 10. To prevent the post 9 or cross beam 10 from being damaged by the cargo or other force, the post 9 may be supported by the base 1 and the cross beam 10 may be supported by making contact with the floor member 22. Since the flanges 20 may be slender, the gaps 21 may likewise only be narrow so that a virtually continuous decking 4,22 may be provided.

When the corner posts 9 are to be erected, they may be raised by some means until the abutment plate 13 makes contact with the corner fitting 17. To lock the corner post 9 in the substantially vertical position the locking device 12,28 is rotated about it's pivot pin 19. If the container is not on even ground, it is possible that the base 1 may be flexible enough to cause some misalignment between the locking device 12,28 and the appertures 25,26. Thus the edges 30 of the locking device 12 and block 28 may be tapered or shaped to catch in the appertures 25,26. As the device 12,28 is rotated the shaped edges 30 force the clevis plate 18 and appertures 25,26 into alignement until the locking device 12,28 can move into the fully locked position.

Alternative mountings of the locking device are possible. Since the appertures 25,26 and clevis plate 18 line up, the locking device may comprise a loose pin or block of size and shape suited to a shape of apperture plates 25,26. The pin may be mounted on the base 1 pivotally instead of being pivotted on the clevis plate 18. The pin may be mounted for sliding movement between the appetures and the clevis plate 18, and the mounting may be either on the corner post 9 or clevis plate 18 and move substantially vertically for the purposes of causing a bridge between the appertures 25, 26 or may be mounted for sliding m tion on th base 1. Any number of clevis plates similar to 18 may be selected and similarly any number of plates 23 and appertures 25 may be selected.

Th length f the locking devic 12 can b extended to provide increased mechanical advantage in vercoming any tightness between the assembly 12, 28 and the appertures 25, 26, or clevis plate 18.

The clevis plate 18 can be seen in Figure 4 to have two arms 53, 54 which may be of any suitable length. Because of opening betw en the arms 53, 54 the length of the locking device 12 is unrestricted with the advantages of operation already stated. Furthermore, if the corner post 9 is to be attached to the clevis plate 18 by welding, the length of the arms 53, 54 can be selected to provide the length of perimeter of clevis plate 18 that may be needed for a good connection, and by having a gap between the arms 53, 54, the weld length may be almost doubled within a given length of clevis plate 18 compared to a plate with no gap. Thus weight of material may be saved.

In Figure 7 the corner post 9 may be formed from a hollow tube with walls 31. Since the weight of the corner posts 9 is great, it is desirable to provide some means to resilliantly bias the posts 9 so that they might be raised and lowered manually. Coil springs are the cheapest form available but must be protected from damage. Thus the spring 32 shown is placed inside the corner post 9 to prevent direct impact from cargo or handling devices, and is protected from the adverse weather conditions which might accelerate corrosion causing the spring 32 to weaken. If a coil of the spring 32 should break through fatigue of the steel or other cause the whol of the resilliant biasing would be released.

In the tension spring arrangement shown in Figure 7, the spring is anchored at one end to the corner post by a hook 33 passing around a pin 34 attached ridgidly to the corner post 9. At the other end of the spring 32, there is another hook 35 attached pivotally to a pin 36 which is ridgidly attached to the base 1 of the container. The spring 32 passes through a gap 38, 37 in the abutment plate 13 and corner fitting 17. When the corner post 9 is collapsed to the position 9' indicated by the dotted line 9' because of the geometrical positions of the pins 34, 36, 11 the spring is caused to extend and provide upwards biassing of the post 9 against it's weight.

In an alternative arrangement of a spring 39, Figure 8 shows a compression spring 39 in an extended and free form when the post 9 is erect. A rod 40 passes through the coils of the spring 39 and is hooked to pin 36 by its end 41. The other end of the rod 40 is fastened to a plate 42 which abuts the end of the spring 39. The other end of the spring 39 abuts the sides of the apperture 38 in the abutment plate 13 and the apperture 38 is smaller than the diameter of the spring 39 so that the spring cannot pass through it.

Refering to Figure 10 and Figure 11 an alternative arrangement of the container and locking device can be seen. The locking device comprising handle 12 and block 28 are mounted for sliding action upon the base 1, 2 and retained for sliding to the base 2 by bracket 55. The handle 12 and block 28 may slide baack and forth in the direction of the arrow D, thereby entering the apperture plates 23, 24. The position of the locking device 12, 28 is this tim selected in front of the corn r post 9 and clevis plate 18. Thus it may not be necessary to have an opening 56 in the clevis plate 18. The height of the base 2, 1 may be selected so that the uppermost surface 57 is

flush with or above the locking device 12, 28.

The shape of the locking device may be varied so that in Figure 11 and 10 an example of this is illustrated. The block 28 is shaped as a wedge so that when engaged with the apperture plates 23, 24 a tightening action may take place the further in the handle 12 is pushed. The surfaces 25, 26 of the apperture plates 23, 24 may be tapered to mate with the wedge angle or shape of to locking device 12, 28. Allso it may not be necessary to have the appertures closed at their outer most faces since the corner post 9 may not move outwards due to the abuttment plate 13 or similar.

As mentioned before the position and shape of the locking device may vary as may the mounting of the locking device, so that a pivoted locking device as shown in Figure 3 and 4 may be mounted on the face of clevis plate 18 rather than within the clevis opening 56.

When the corner post 9 is collapsed, the rod 40 starts to compress the spring 39 against the abutmant plat 13. Such a spring 39 is unstable in compression and so is conveniently supported by the walls 31 of the hollow corner post 9. When full collapsed, the corner post 9 has acting upon it the compressive force in the spring 39 to assist and urge the post 9 upwards to the erect postion. Should any of the coils of the spring 39 break, only a small movement of the spring takes place and this is held safely in place by the rod 40 so that there is still some biassing provided by even the broken spring.

In the folded position, the corner post 9 may partially or wholely cover the fork tyne handling appertures 5. However the posts 9 can pivot about the pins 11 so that a slight movement of the posts upwards reveals the appertures sufficiently to allow access to the tynes.

Figure 9 shows three views of the base corner of a collapsed container and there is provided a device for linking two collapsed containers together. The device comprises a conical head 45 which in plan view is elongated. The head 45 is ridgidly connected to a tail piece 46 via a round section shaft 47 and these threee 45, 46, 47 can rotate freely within a collar 48. The plan shape of the collar 48 is similarly elongated as the head 45. An operating handle 49 is attached pivotally to the tail 46 by a pin 50., which allows the handle 49 to fall freely in towards the base 1 to position 49A. If it is desired to rotate the head 45 the handle may be moved through the arc indicated by arrow c to position 49B and there captivated by dropping into the vee of hook 51. The rotated head 45 is indicated by dotted line 45' and maybe linked in this position to the bottom corner fitting 6' shown also in dotted line. The elongated shape of the head 45 and tail 46 matches the elongated appertures in the corner fittings 17, 6 so that wh n rotated cannot be pulled through the appertures and thereby enable the fittings to be locked together. On either side of the collar 48 are projections 52 which support the collar upon the top of the corner fitting 17.

Because the handle can fall inside th base 1, no damag can befall it due to the close passing of a vehicle or other moving object. The handle 49 may be operat d from the sid of the contaienr bas 1 which enables relaease of the head 45 or locking of the head 45 to another container fitting 6' when there is an obstruction on the end of the base. For containers with fittings 6 of standardised form, they can be linked with the heads 45 if the corner fittings 17 are positioned in standard places.

CLAIMS (Filed on 12 May 1983)

1. A folding container comprising a ridgid platform base to which are pivotally attached structural members which in their erect position are substantially vertical and in their folded position are substantially horizontal lying adjacent to the platform base, and which structural members may be prevented from folding towards the base by one or more bars placed across the path of the structural member acting upon the structural member at a suitable distance from the member's pivot and supported ridgidly by the base structure, and which structural members rest upon horizontal abutment faces of the base when in the erect position, and through which abutment faces are formed handling apertures which are exposed when the structure is folded towards the base.

2. A container as claimed in claim 1 wherein the basal support for the bars is provided by an extension of the base structure.

3. A container as claimed in claim 1 wherein the bars are releasably mounted on the folding structure such that when moved froms the path of the folding structure are carried with the structure.

4. A container as claimed in claim 3 wherein th bars are mounted within the profile of the folding structure.

5. A container as claimed in claim 1 wherein the bars are releasably mounted within the base such that when moved from the path of the folding structure are retained by the base.

6. A container as claimed in any of the preceding claims wherein the bars pivotally mounted.

7. A container as claimed in claims 1 to 5 wherein the bars are slideably mounted.

8. A container according to claim 6 wherein the bars are extended by a handle.

9. A container according to any of the preceding claims wherein the bars are wedge shaped at the contact faces with the folding structure and basal support such that by further engagement in the direction of the narrow end of the wedge will cause a tighter abutment with the basal support and the folding structure.

10. A container according to any of the preceding claims wherein the edges of the bars are tapered from their abutment faces to facilitate engagement into position should there be a degree of misalignment between the folding structure and th basal support n ar the erect position.

11. A container according to any of the preceding claims wherein the folding structure is resiliantly biased by a device contained within the profile of the structure and pivotally anchored to the folding structure at one end and pivotally anchored to the base structure at the other end.

12. A container according to claim 11 wherein

the folding structure comprises a hollow section member.

13. A container according to claim 11 wherein the resiliant biasing comprises a tension coil spring.

14. A container according to claim 11 wherein the resiliant biasing comprises a compression coil spring.

15. A container according to claim 14 and 13 wherein the spring is supported by the folding structure.

16. A container according to claim 11 wherein the resiliantly biasing device links to the base by an extension which passes through the handling aperture in the base.

17. A container according to claim 16 wherein the extension rotates out of the handling aperture when the structure is folded through an opening in the handling aperture through the abutment face.

18. A container according to any of the preceding claims wherein the folding structure is partly formed from an open section which envelopes a projecting part of the base structure when folded upon it and is supported by the projecting part.

19. A container according to any of the preceding claims wherein there is provided an interlinking twistlock device having an operating handle which is pivotally mounted to the rotatable part of the twistlock which pivot is substantially perpendicular to the axis of the twistlock rotatable part and which handle may drop into locating slots positioned within the base so as to prevent rotation of the twistlock until so released.

20. A container according to claim 19 wherein the operating handle passes through an opening in the handling aperture through the abutment face during part of its positioning or operating process.

21. A container substantially as herein described with reference to any one of the embodiments shown in the accompanying drawings.

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